

CLAIMS

What is claimed is:

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1 1. A method for the detection of an analyte in a sample, which comprises
2 contacting the sample to be tested with a three-dimensional array of a polydiacetylene
3 backbone having a substrate incorporated in the array, wherein the substrate has direct
4 affinity for the analyte or can function as a binder to the analyte or can react with the
5 analyte;
6 and detecting the change in fluorescence to indicate the presence of the analyte.

1 2. The method of claim 1 wherein the array is in the form of a solution of
2 liposomes or tubules.

1 3. The method of claim 1 wherein the analyte is an enzyme and the substrate
2 is a reactive substrate of that enzyme.

1 4. The method of claim 1 or 2 wherein the analyte is an antigen and the
2 substrate is the antibody of that antigen.

1 5. The method of claim 1 or 2 wherein the analyte is an antigen and the
2 substrate is a fragment of the antibody of that antigen.

1 6. The method of claim 1 or 2 wherein the analyte is an antibody or antibody
2 fragment and the substrate is the antigen of that antibody.

1 7. The method of claim 1 or 2 wherein the analyte is an antibody or antibody
2 fragment and the substrate is the epitope of that antibody.

1 8. The method of claim 2 wherein the analyte is an enzyme and the substrate
2 is a reactive substrate of that enzyme.

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10. The method of claim 1 wherein the substrate includes a ligand.

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11. The method of claim 1 ~~wherein the array is in the form of a solution of a liposome or tubule.~~

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12. The method of claim 1 wherein the substrate includes a reactive substrate.

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13. The method of claim 12 wherein the array is in the form of a solution of a liposome or tubule.

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14. The method of any one of claims 1 to 13 wherein the three-dimensional array further comprises a fluorophore and wherein the change in fluorescence of the polydiacetylene array is monitored.

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15. The method of any one of claims 1 to 13 wherein the three-dimensional array further comprises a fluorophore and wherein the change in fluorescence of the fluorophore is monitored.

1 16. The method of claim 1 wherein the array does not contain a further
2 fluorophore.

1 17. The method of claim 1 wherein the change in fluorescence is detected by
2 exposure to light having wavelengths below 550 nm and measurement of the emission.

1 18. The method of claim 1 wherein the change in fluorescence is detected by
2 exposure to light having wavelengths between 450 and 500 nm and measurement of the
3 emission.

1 19. The method of claim 1 wherein the polydiacetylene of the array exhibits
2 fluorescence and the fluorescence increases as an indication of the presence of the
3 analyte.

1 20. A method for the detection of an analyte in a sample which comprises
2 contacting the sample to be tested with a two-dimensional array of a polydiacetylene
3 backbone having a substrate incorporated in the array, wherein the substrate has direct
4 affinity for the analyte or can function as a binder to the analyte or can react with the
5 analyte and wherein the two-dimensional array comprises a polymerized diacetylene
6 array wherein no more than 90% of the diacetylenes are terminated with groups that
7 specifically bind to the analyte;
8 and detecting the change in fluorescence to indicate the presence of the analyte.

1 21. The method of claim 20 wherein the two-dimensional array comprises a
2 polymerized diacetylene array wherein no more than 60% of the diacetylenes are
3 terminated with groups that specifically bind to the analyte.

1 22. The method of claim 20 wherein the array is coated onto a solid support.

1 23. The method of claim 22 wherein the solid support is a porous membrane.

1 24. The method of claim 20 wherein the array is unsupported.

1 25. The method of claim 20 which further comprises providing a filter or flow
2 cell containing the array supported on or in a porous membrane; and passing a solution of
3 the analyte through the filter or flow cell before or during the detect.

1 26. The method of claim 20 wherein the substrate includes a ligand.

1 27. The method of claim 26 wherein the array is on a nano-porous membrane.

2 28. The method of claim 20 wherein the substrate includes a reactive
3 substrate.

1 29. The method of claim 28 wherein the array is on a nano-porous membrane.

1 30. The method of claim 20 wherein the two-dimensional array further
2 comprises a fluorophore and wherein the change in fluorescence of the polydiacetylene
3 array is monitored.

1 31. The method of claim 20 wherein the two-dimensional array further
2 comprises a fluorophore and wherein the change in fluorescence of the fluorophore is
3 monitored.

1 32. The method of claim 26 or 28 wherein the three-dimensional array further
2 comprises a fluorophore and wherein the change in fluorescence of the polydiacetylene
3 array is monitored.

1 33. The method of claim 26 or 28 wherein the three-dimensional array further
2 comprises a fluorophore and wherein the change in fluorescence of the fluorophore is
3 monitored.

1 34. The method of claim 20 wherein the array does not contain a further
2 fluorophore.

1 35. The method of claim 20 wherein the change in fluorescence is detected by
2 exposure to light having wavelengths below 550 nm and measurement of the emission.

1 36. The method of claim 20 wherein the change in fluorescence is detected by
2 exposure to light having wavelengths between 450 and 500 nm and measurement of the
3 emission.

1 37. The method of claim 20 wherein the polydiacetylene of the array exhibits
2 fluorescence and the fluorescence increases as an indication of the presence of the
3 analyte.

1 38. A method for the detection of an analyte in a sample which comprises
2 contacting the sample to be tested with three-dimensional arrays of a polydiacetylene
3 backbone having a substrate incorporated in the arrays, wherein the substrate has direct
4 affinity for the analyte or can function as a binder to the analyte or can react with the
5 analyte, and the arrays are suspended in solution; and detecting the change in polarization

6 of the fluorescence of the polydiacetylene arrays upon being excited with polarized light,
7 to indicate the presence of the analyte.

1 39. The method of claim 38 wherein the three-dimensional arrays are
2 liposomes.

1 40. The method of claim 38 or claim 39, wherein the substrate is an antibody
2 and the analyte an antigen to that antibody.

1 41. The method of claim 38 or claim 39, wherein the substrate is an antibody
2 fragment and the analyte an antigen to that antibody fragment.

1 42. The method of claim 38 or claim 39, wherein the analyte is immobilized
2 onto a surface.

1 43. The method of claim 38 or claim 39 wherein the analyte is attached to a
2 microbead.

1 44. The method of claim 38 or claim 39 wherein the analyte is attached to a
2 macrobead.

1 45. The method of claim 38 wherein the three-dimensional arrays also contain
2 fluorophores and the change in the polarization of the fluorophore emission upon the
3 polydiacetylene array being excited with polarized light is detected to indicate the
4 presence of the analyte.

1 46. The method of claim 45 wherein the three-dimensional arrays are
2 liposomes.